

New boundaries for the Interventional Cardiology: the elder

Nuevas fronteras para la Cardiología Intervencionista: el anciano

Arnaldo Rodríguez León^a, MD, MSc; and Francisco L. Moreno-Martínez^b✉, MD, MSc

^a Department of Cardiology. *Hospital Universitario Dr. Celestino Hernández Robau*. Santa Clara, Villa Clara, Cuba.

^b Division of Interventional Cardiology and Cardiac Catheterization. *Cardiocentro Ernesto Che Guevara*. Santa Clara, Villa Clara, Cuba.

Received: 19 December 2015

Accepted: January 7, 2016

Key words: Interventional Cardiology, Angioplasty, Electrophysiology, Pacemaker, Aging

Palabras clave: *Cardiología Intervencionista, Angioplastia, Electrofisiología, Marcapasos, Envejecimiento*

To the Editor:

“Medicine is sublime as a profession, but extremely humble as a science”. Gregorio Marañón, MD¹.

Man has approached the limits of his biological possibilities. The amazing advances in biomechanics shocked the world in the Olympic Games of Beijing 2008, and London 2012, when watching the speed reached by Jamaican Usain Bolt on the tracks and by American Michael Phelps on the pools, who with his victory in London became the first male swimmer to win the same event (200-meter individual medley) in three consecutive Olympic games. And if that was not enough, he repeated the feat in 100 meters butterfly². Meanwhile, Usain Bolt, the fastest man in the world, set an Olympic record clocking 9 seconds and 63 hundredths in the 100 meters dash³.

These achievements demonstrate the human being's potential and leave open the question of whether it is possible to go further, when violating gravitational physical laws with a predominantly anaerobic activity that today would astonish the very Albert Einstein and his theory of general relativity.

However, medicine has ethical barriers that keep it from developing faster. Testing innovative shoes or bathing suits to evaluate whether one runs or swims faster is not the same as testing a new drug (Nepriylsin⁴, protein inhibitors PCSK9⁵) or intracoronary (stent), intracardiac (electrode) or intraval-

ular device (MitraClip, transcatheter aortic valve implantation [TAVI])⁶, which long-term effects could be harmful, so thousands of patients are required, many studies, several years follow-up to know their effectiveness, toxicity and adverse effects; as well as randomized clinical trials to prove their efficacy⁷.

Cardiology needed, just like physics at its time, an intelligent and bold man like Andreas Gruentzig, who only two years after showing what he was capable of doing in the epicardial coronary arteries of a dog, performed the first percutaneous transluminal coronary angioplasty (PTCA) in a human being⁸, in 1977. Thus was born the percutaneous coronary intervention (PCI), as a manifestation of the Interventional Cardiology development which at that time was restricted to the implantation of huge devices to keep heart rate in patients with atrioventricular blocks, and that in a few years achieved significant scientific and technical advances.

Electrophysiology is part of the Interventional Cardiology today, with a slower but equal entrepreneurial and stimulating development⁹, as evidenced by the recent addition of wireless pacemakers (PM) to the therapeutic arsenal, which foresee the end of PM endocarditis¹⁰.

It's been four decades since Gruentzig treated that anterior descending artery, and cumulative evidence supports the hope of further progress in this field; however in the social context has emerged a new phenomenon that determines its further de-

velopment: aging population⁹. Statistics are alarming; as average estimates of the United Nations indicate that world population will grow from 6.555 million in 2006 to 7.940 million in 2025, with the consequent increase in the elderly population that would increase from 600 to 1.100 million in the same period of time⁹. The situation in Cuba is no different, 16% of the Cuban population was over 60 years in 2005, and will get close to 20% in 2020, a rate that is 30 years ahead of other countries in the area. Villa Clara in particular is recognized as the province with the oldest population in the country⁹.

The first primary PTCA carried out at the *Cardio-centro Ernesto Che Guevara* was performed to a 72 year-old patient with a large anterior myocardial infarction^{11,12}. PCI in the elderly adds difficulty to the process, mainly because this age group has greater comorbidity, arteries calcification, chronicity of the lesions, and lesser resistance or adequate response to ischemia-reperfusion period that sometimes is inevitable during PCI¹³. Moreover, Villa Clara's PM record shows that 1.928 devices were implanted between 2003 and 2008 representing an average of 321.3 per year and an encouraging rate of 400 per million inhabitants (a developed country would implant approximately 300 per million inhabitants); however, these figures could be higher today if there were not economic difficulties that hinder constant MP availability in our country. Approximately four out of five of these devices are implanted in patients older than 65 years "elderly", and more than half in people over 75, those known as "old elderly", which corresponds to the demographic characteristics of Villa Clara population⁹. Besides, in this province, as in other developed countries, has emerged a group of elders that deserve special attention: the so-called "very old elder" who are patients older than 90 years, predominantly women, who have required around a 6% out of all first implants of this region.

What impact does currently Interventional Cardiology have in the population's longevity?

Although there is no doubt concerning the usefulness and development of this specialty, this is a hard question to answer because it represents a gap between the perfection of the truth we have and the truth we want, that one the Spanish writer and brilliant doctor Gregorio Marañón spoke about (1887-1960)^{1,9}.

Several years ago we agreed to write this Letter to the Editor; however, this document was never sent and today we have had to adjust its content to this new era, to new technologies and increasingly grow-

ing challenges imposed on us by science, life, longevity and current economic circumstances of a country like Cuba.

Those "new boundaries" the elderly accounted for Interventional Cardiology several years ago have also changed, despite maintaining the same concept. Before, we worried about patients' age before entering the operating room, because life expectancy had increased and we were progressively assisting even more older patients with acute coronary syndromes; however, the disease's context has changed today and instead of setting age limits we have expanded our boundaries¹³. Years ago an 80% of Interventional Cardiology resources were set aside for the treatment of coronary artery disease which represented and represents also an 80% of any of our units' activity. Today, 80% of those resources is assigned to 20% of the diseases we treat, for although coronary disease remains being an 80% of our activity we have significantly increased interventionism on structural heart disease, mainly TAVI, left atrial appendage closure –to minimize thromboembolic risk and leave anticoagulation aside– congenital heart diseases correction, primarily septal defects, and the increasing use of left ventricular assist devices, among which is the Impella¹⁴.

That formerly objective of treating greater amounts of elderly patients with acute coronary syndrome regardless their age, remains but is no longer a challenge. It is something from the past that was achieved by far and today we see it as normal. In fact, our challenge today is not only to prolong but improve their quality of life by providing care and procedures that were unthinkable decades ago. Let us hope that in the near future these technological advances move from the anecdotal to everyday reality in our country.

Aging poses new frontiers for almost all medical specialties; but this irreversible natural process (beyond current technological development and skills acquired by professionals) is not only determined by strictly biological principles, but also by social, economic, cultural and because of the environment in which humans interact individually and as a population group¹⁵.

With the same expectation that today we expect the Olympics in Rio de Janeiro 2016, we are confident that the professional and the medical industry development will continue surprising the world and be able to implement new increasingly safe, effective and sufficiently cost/effective "records" so that they are available to those in need, regardless their ori-

gin, ethnicity, religion, political affiliation or income. Perhaps prolonging life is not the only way; but prolonging it with quality certainly is.

REFERENCES

1. Sánchez Ron JM, García Barreno P, Segovia de Arana JM, Salas Falgueras M. Medicina. Grandes vidas de la España de nuestro tiempo 2. Oviedo: Editorial Universitaria Ramón Areces; 2006.
2. Lord C. Franklin Pips Phelps for Top Honour. SwimNews.com [Internet]. 2012 [citado 12 Dic 2015]. Disponible en: <http://www.swimnews.com/News/view/9743>
3. Varlet M, Richardson MJ. What would be Usain Bolt's 100-meter sprint world record without Tyson Gay? Unintentional interpersonal synchronization between the two sprinters. *J Exp Psychol Hum Percept Perform*. 2015;41:36-41.
4. Mills J, Vardeny O. The role of neprilysin inhibitors in cardiovascular disease. *Curr Heart Fail Rep*. 2015;12:389-94.
5. Everett BM, Smith RJ, Hiatt WR. Reducing LDL with PCSK9 inhibitors - The clinical benefit of lipid drugs. *N Engl J Med*. 2015;373:1588-91.
6. Candreva A, Maisano F, Taramasso M. MitraClip and Transcatheter Aortic Valve Implantation (TAVI): State of the Art 2015. *Curr Heart Fail Rep*. 2015;12:379-88.
7. Ferreira González I, Urrutia G, Alonso-Coello P. Revisión sistemática y metaanálisis: bases conceptuales e interpretación. *Rev Esp Cardiol*. 2011;64(8):688-96.
8. Rodríguez Blanco S, Almeida Gómez J. Angioplastia percutánea con stent en el tronco principal de la arteria coronaria izquierda. *CorSalud [Internet]*. 2012 [citado 12 Dic 2015];4:266-71. Disponible en: <http://www.corsalud.sld.cu/sumario/2012/v4n4a12/actptci.html>
9. Rodríguez León A, Santos Monzón Y, Mora Marrero FA, Eirín Rey JM. Estimulación cardíaca en el anciano ¡Nuevos tiempos, más viejos! *CorSalud [Internet]*. 2009 [citado 12 Dic 2015];1:[aprox. 3 p.]. Disponible en: <http://www.corsalud.sld.cu/sumario/2009/v1n2a09/estimulacion.htm>
10. Pachón M, Puchol A, Akerström F, Rodríguez-Padial L, Arias MA. Implante de marcapasos sin cables transcáteter Micra: experiencia inicial en un centro español. *Rev Esp Cardiol*. 2016;69:346-9.
11. Moreno-Martínez FL, Aladro Miranda I, Ibargollín Hernández RS, Vega Fleites LF. La primera angioplastia primaria realizada en Santa Clara, 12 años después. *CorSalud [Internet]*. 2009 [citado 15 Dic 2015];1:[aprox. 4 p.]. Disponible en: <http://www.corsalud.sld.cu/sumario/2009/v1n3a09/primera.htm>
12. Moreno-Martínez FL, Fleites HA, Ibargollín R, Vega LF. La primera angioplastia coronaria transluminal percutánea primaria en el infarto agudo de miocardio en Villa Clara. Informe de caso. *Mediciego [Internet]*. 2005 [citado 15 Dic 2015];11(Supl 1):[aprox. 4 p.]. Disponible en: http://bvs.sld.cu/revistas/mciego/vol11_supl1_05/casos/c1_v11_supl105.htm
13. Santos Pérez A, Valero Hernández A. Factores relacionados con la evolución intrahospitalaria del síndrome coronario agudo. *CorSalud [Internet]*. 2015 [citado 12 Dic 2015];7:161-8. Disponible en: <http://www.corsalud.sld.cu/sumario/2015/v7n3a15/sca-evol.html>
14. Kovacic JC, Kini A, Banerjee S, Dangas G, Massaro J, Mehran R, *et al*. Patients with 3-vessel coronary artery disease and impaired ventricular function undergoing PCI with Impella 2.5 hemodynamic support have improved 90-day outcomes compared to intra-aortic balloon pump: a sub-study of the PROTECT II trial. *J Interv Cardiol*. 2015;28:32-40.
15. Arnett DK. Transforming cardiovascular health through genes and environment: presidential address at the American Heart Association 2012 Scientific Sessions. *Circulation*. 2013;127:2066-70.